

Ship April 20

Work Order ID 79633

\*79633\*

Page 1

February-01-12 11:19:33 AM

Item ID: D206-667-207BL

Accept

\*N900040100\*

Setup Start \*NS1\*

Revision ID:

Stop \*NS2\*

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals: Process Plan: M.L.J

Date: 12/02/01

Tooling:

Date:

Run Start \*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop \*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr	Revision Nbr
D206-667-247	A (DEO)
IIN-D206-667	D

100

0.00

\*100\*

DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D206-667-207 chg 002

8.2/3/07

12-3-26

110

0.00

\*110\*

BENDING MACHINE - CROSSTUBES

CNC Bend 2

Memo

0.00

CNC Alpha 160 Bender

Bend tube as per Dwg D206-667-247 using CNC bender program D206-667-207

12-3-12

12-3-12

Pho-)

W/O: 79633		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D206-667-207BL PAR #: \_\_\_\_\_ Fault Category: X-tube NCR: Yes No DQA: Yes No Date: 12/03/29  
 Resolution: Use as is Disposition: Use as is QA: N/C Closed: Yes No Date: 12/3/29

NCR: 12-1296		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
12.3.12	110	CRUSHING AFTER BENDING IS over tolerance	CP 12.03.12 PSLW	Acceptable per attached SR	1/2	5 17/03/12	CP 12.03.12 PSLW	5 12/03/12

NOTE: Date & initial all entries

**Work Order ID 79633**

February-01-12 11:19:33 AM

**\*79633\***

Page 2

Item ID: D206-667-207BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: Date:

Tooling: Date:

Run Start **\*NR1\***

QC: Date:

SPC (Y/N): Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

120

QC15- Crosstube Dimensional Check

0.00

**\*120\***

QC

Memo

0.00

81203/12

Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries

**Work Order ID 79633****\*79633\***

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**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

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Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

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Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

130

0.00

**\*130\***

Crosstubes

Crosstubes

Memo

0.00

1-Drill pilot holes in tube using drill Jig DT8583 & DT8584 and drill table DT8577 and tower holes #6 as per QSI0010 and as per Dwg D206-667-247. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 & DT8584 as per Dwg D206-667-247 Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT 8584 & DT8583 as per Dwg D206-667-247. Drill only the top (2) holes.

5-Drill & ream the top (2) holes to finish size using drill Jig DT8583 & DT8584 as per Dwg D206-667-247

6-Drill Fwd rivet holes using drill Jig DT8787 as per Dwg D206-667-147. Note: Fwd side has 3x top holes.

7-Drill Aft rivet holes using drill Jig DT 8787 as per Dwg D206-667-247.

8-C'sink holes as per Dwg D206-667-247.

9 -Scribe part # and batch # using vibrating stylus as per Dwg D206-667-247 Inside of Cuff (Do not engrave on outside of tube)

10 -Deburr & Inspect for surface damage. Repair damage within limits as per

MO

12/3/12

MO

12/3/12

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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NOTE: Date & initial all entries

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Item ID: D206-667-207BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Dwg  
D206-667-247

140

Crosstubes Chemical Conversion

0.00


**\*140\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

 12-3-12

150

QC3- Inspect Part Finish

0.00

**\*150\***

QC

Memo

0.00

Quality Control

S 12/3/13

160

QC5- Inspect part completeness to step on W/O

0.00

**\*160\***

QC

Memo

0.00

Quality Control

S 12/3/13

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



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**\*N900040100\***

Setup Start \*NS1\*

Stop **\*NS2\***

**Start Date:** 30/01/2012    **Start Qty:** 1.00    **\*1\***

**Cust Item ID:**

**Required Date:** 20/04/2012      **Req'd Qty:** 1.00      **\* 1 \***

**Customer:**

**Reference:**

Run Start \*NR1\*

**Approvals:** \_\_\_\_\_ **Process Plan:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Tooling:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Stop \*NR2\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

**Insp.  
Stamp**

0.00

**\*170\***

0.00

Liquid Penetrant Inspection as per QSI 038Or

Issue P/O: 164/56  
LPI as per ASTM 1417

Level 2 Attach copy of NDT results to work order

0.00

**\*180\***

0.00

Ensure copy of NDT results attached to work order.

0.00

\*190\*

0.00

Ensure results are as per Dwg D206-667-247

8.2/03/16

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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# Work Order ID 79633

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Item ID: D206-667-207BL

Accept

**\*N900040100\***

Setup Start

**\*NS1\***

Revision ID:

Stop

**\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start

**\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop

**\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
200		0.00							
<b>*200*</b>	SprayPaint					<u>AS</u>	<u>12</u>	<u>- 3 - 16</u>	
SprayPaint	Memo	0.00							
Spray Painting	PRIME B <u>117319</u>								
	DELFLEET BLUE B <u>118395</u>								
	CLEAR DELFLEET B <u>118093</u>								
210	QC14- Inspect Spray Paint	0.00							
<b>*210*</b>						<u>W</u>	<u>12</u>	<u>- 03 - 19</u>	<u>(1)</u>
QC	Memo	0.00							
Quality Control	Wrap in plastic bag to protect from scratches								
220		0.00							
<b>*220*</b>	Crosstubes					<u>AS</u>	<u>12</u>	<u>- 3 - 19</u>	
Crosstubes	Memo	0.00							
Crosstubes	I-Install nut plates as per Dwg D206-667-247.								

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 79633**

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Item ID: D206-667-207BL

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Revision ID:

Stop **\*NS2\***

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Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start **\*NR1\***

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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230

0.00

**\*230\***

Skidtubes

Crosstubes

Memo

0.00

Crosstubes

1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper,  
clean the area with 4105S wash 'n' wipe

2-Install supports with Proseal 890 per DSI9565 and QSI 015

A/R Proseal 890 Batch: 120867

3- Torque bolts as per dwg

AB 12 - 3 - 22

240

QC5- Inspect part completeness to step on W/O

0.00

**\*240\***

QC

Memo

0.00

Quality Control

8/26/26

250

Pick Kit

0.00

**\*250\***

Packaging

Memo

0.00

Packaging

S3 12-03-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**NOTE:** Date & initial all entries

**Work Order ID 79633**

February-01-12 11:19:33 AM

**\*79633\***

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Item ID: D206-667-207BL

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**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Aft

Start Date: 30/01/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 20/04/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start **\*NR1\***

QC: Date: SPC (Y/N): Date:

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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260 QC4- 100% Inspect kits for completeness 0.00

**\*260\***

QC

Memo

Quality Control

0.00

8/2/03/22

270

0.00

**\*270\***

Packaging

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D206-667-207

Location:

PPP Rev:

117 A

6/3/07

280

0.00

**\*280\***

QC21- Final Inspection - Work Order Release

QC

Memo

0.00

Quality Control

12/3/28

12-03-27

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
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**NOTE:** Date & initial all entries



# Picklist Print

February-01-12 11:19:37 AM

Page 1

Work Order ID: 79633

\*79633\*

Parent Item: D206-667-207BL

\*D206-667-207BL \*

Parent Item Name: Crosstube Mid Aft

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: RevA 11.01.13 New Issue EC verified by:DD  
11.08.08 PER ECN 11-615 DD VERF:EC

IPP REV:B

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D206-667-247TRN		Manufactured	No			110	Each	2.0000	1	1			

\*D206-667-247TRN\*

Crosstube Assembly, Mid Aft

\*\*

Location	Loc Qty	Loc Code
LG 79668	2	
78672	1	
78906	1	

① MO 12/3/12

D2873-043 Manufactured No

220 Each 26.0000 2 2

\*D2873-043\*

Nut Plate Assembly

\*\*

Location	Loc Qty	Loc Code
80228		
LG052	26	
72644	2	
73605	4	
75010	20	

② AB 12-3-19

D2873-045 Manufactured No

220 Each 19.0000 2 2

\*D2873-045\*

Nut Plate Assembly

\*\*

Location	Loc Qty	Loc Code
80162		
LG052	19	
74985	19	

② AB 12-3-19

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Work Order ID: 79633

**\*79633\***

Parent Item: D206-667-207BL

**\*D206-667-207BI \***

Parent Item Name: Crosstube Mid Aft

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

MS20601-AD4W10

Purchased

No

220

Each

137.0000

14

14

**\*MS20601-AD4W10\***

\*\*

AS 12-3-19

RIVET

## Location

## Loc Qty

## Loc Code

LG051

137

118675

37

119386

100

14

D2892-1

Manufactured

No

230

Each

14.0000

2

2

**\*D2892-1\***

\*\*

AS 12-3-22

Support

## Location

## Loc Qty

## Loc Code

LG052

14

72483

14

2

D3595-063-450

Manufactured

No

230

Each

102.1095

4

4

**\*D3595-063-450\***

\*\*

AS 12-3-22

RUBBER CUSHION

## Location

## Loc Qty

## Loc Code

MAT052

102.109474

67353

2

68893

6

70113

0.56

71354

0.2

74113

0.349474

75597

13

77678

80

4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Parent Item: D206-667-207BL

Parent Item Name: Crosstube Mid Aft

\*79633\*

\*D206-667-207BL \*

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

MS21920-22

Purchased

No

230

Each

68.0000

4

4

\*MS21920-22\*

Clamp(per MIL-DTL-8783C)

\*\*

AS 12-3-22

## Location

## Loc Qty

## Loc Code

LG

50

119543

50

LG050

18

116207

7

117506

1

118186

10

AN5-10A

Purchased

No

250

Each

436.0000

10

10

\*AN5-10A\*

Bolt

\*\*

m20770 SP. SP

## Location

## Loc Qty

## Loc Code

ST337

436

118191

80

119547

256

119981

100

AN5-32A

Purchased

No

250

Each

274.0000

4

4

\*AN5-32A\*

Bolt

\*\*

SP 12-03-26 SP

## Location

## Loc Qty

## Loc Code

ST339

274

118422

2

118628

22

118983

25

119328

100

119862

50

120423

75

February-01-12 11:19:37 AM

Shop Packet Print

Page 3

**Dart Aerospace Ltd**

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Work Order ID: 79633

**\*79633\***

Parent Item: D206-667-207BL

**\*D206-667-207BI \***

Parent Item Name: Crosstube Mid Aft

Start Date: 30/01/2012

Required Date: 20/04/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-34A

Purchased

No

250

Each

106.0000

4 4

**\*AN5-34A\***

Bolt

\*\*

SP SP

Location

Loc Qty

Loc Code

ST339

106

117794

26

119328

30

120422

50

4x

AN960JD516

NAS1149D0563J

Purchased

No

250

Each

0.0000

18 18

**\*AN960JD516\***

Washer

\*\*

M119717 SP SP

MS21042L5

Purchased

No

250

Each

1,916.000

4 4

**\*MS21042L5\***

Nut

\*\*

SP 12-03-26 SP

Location

Loc Qty

Loc Code

ST300

1916

116105

5

116548

43

117611

46

118179

322

119109

1500

4x

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



Item	Qty	Part Number	Description
	-247		
1	X	D206-667-247	CROSSTUBE ASSEMBLY (206L MID AFT)
2	1	D6004-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2892-1	SUPPORT
6	4	D3595-063-450	RUBBER CUSHION
7	4	MS21920-22	CLAMP
8	14	MS20601AD4W10	RIVET (OR NAS9302B-4-10)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299- 947-100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6004-115  
FINISHED LENGTH = 99.76±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-247" AND BATCH NUMBER ON INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS).
- 7) WEIGHT: 21.1 lbs (-607 = 17.7 lbs)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 10 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2892-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-22 CLAMPS WITH D3595-063-450 RUBBER CUSHIONS TO SECURE THE D2892-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

79633 M.L.J  
12/02/01

DEO ATTACHED

BCW #11-615  
11.07.28

UNDER REVIEW

RELEASED  
2011-05-24

A	NEW ISSUE	CP	10.12.23
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.12.23		

DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D206-667-247	REV. A SHEET 1 OF 4
TITLE CROSSTUBE ASS'Y (206L MID AFT)	SCALE NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

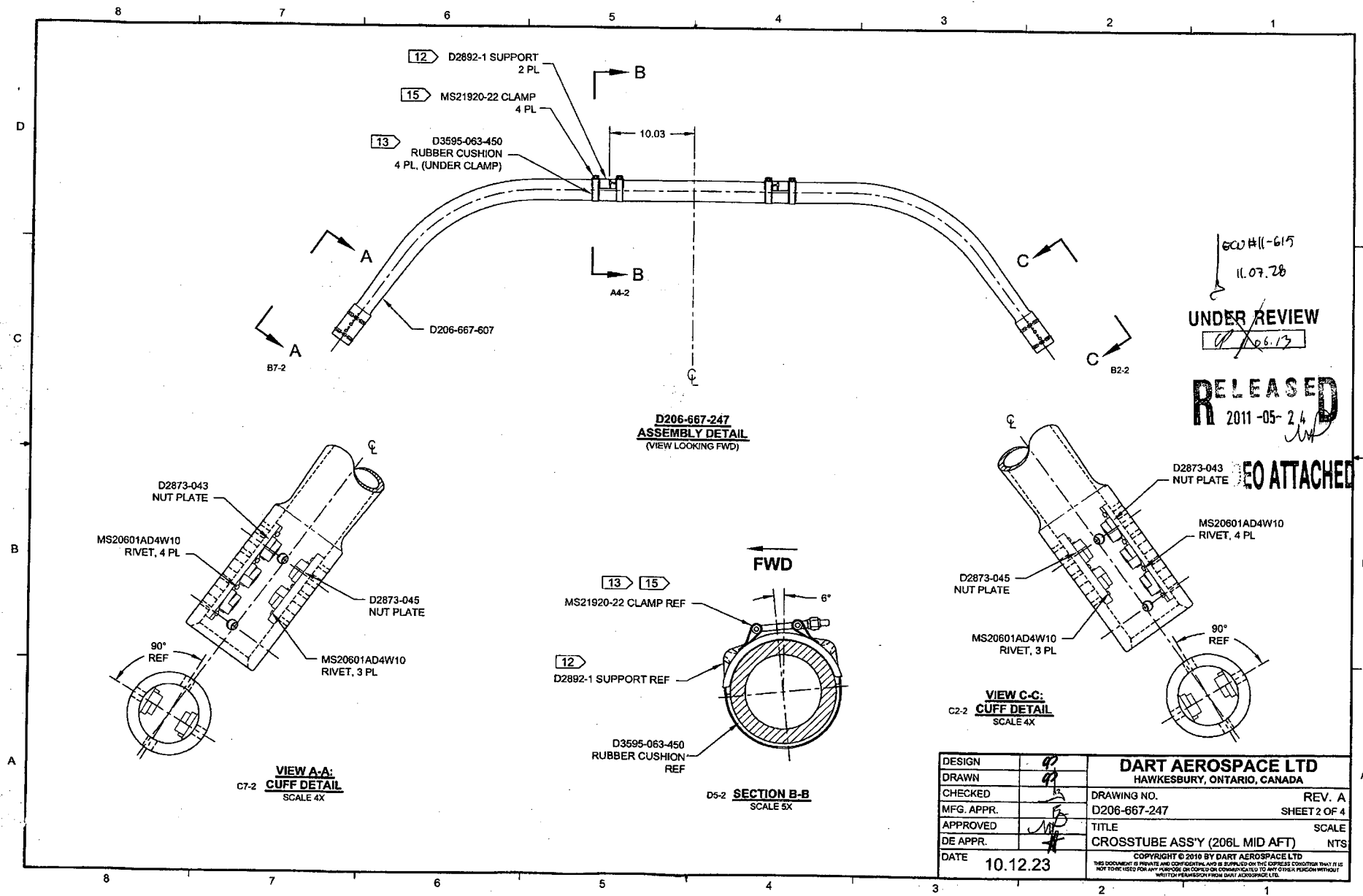
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

79633



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

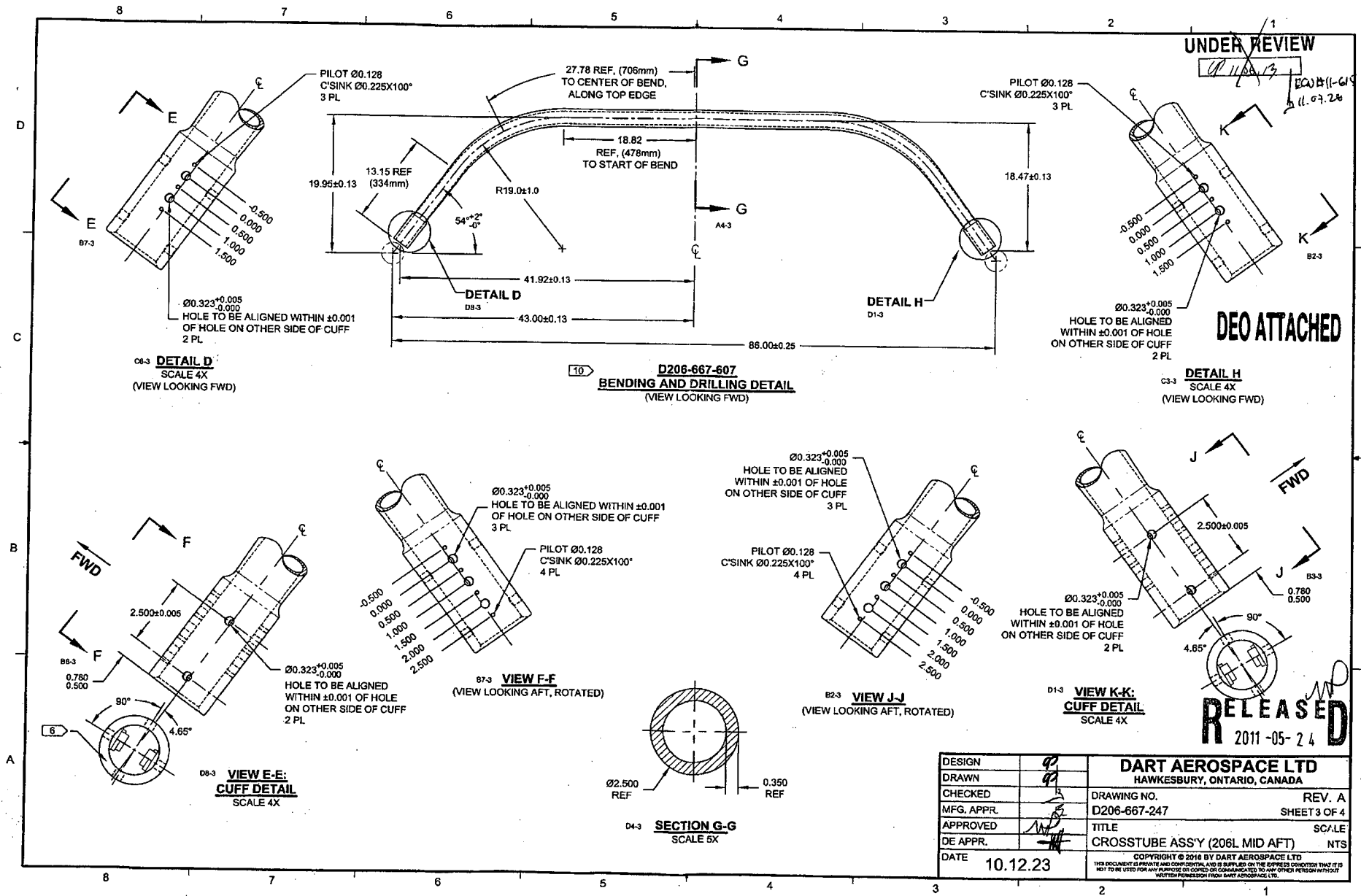
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

79633



DESIGN	97	<b>DART AEROSPACE LTD</b>	
DRAWN	97	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D206-667-247	SHEET 3 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (206L MID AFT)	NTS
DATE	10.12.23	COPYRIGHT © 2010 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

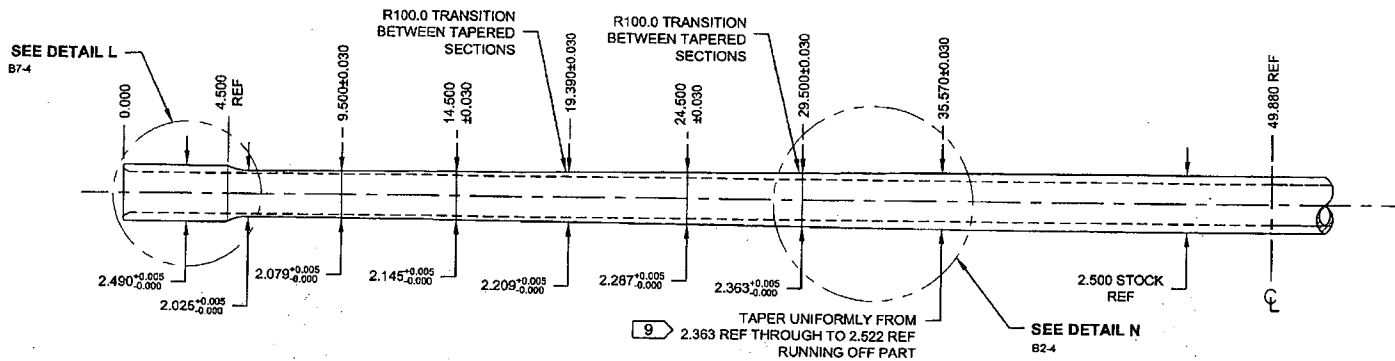
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Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

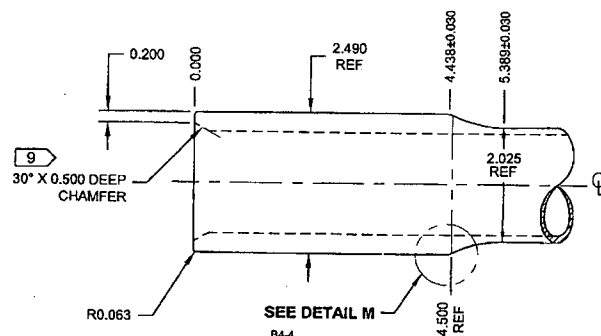
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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

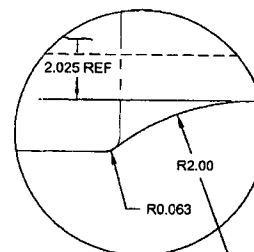
79633



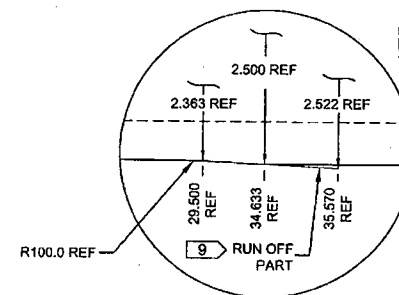
TURNING DETAIL



C7-4 DETAIL L: CROSSTUBE CUFF  
SCALE 2.5X



B6-4 DETAIL M:  
CUFF TRANSITION  
NOT TO SCALE







C4-4 DETAIL N:  
TAPER RUN-OFF  
NOT TO SCALE

DCW #4-617  
11.07.28  
UNDER REVIEW  
11.08.13

DEO ATTACHED

RELEASED  
2011-05-26

DESIGN	92	<b>DART AEROSPACE LTD</b>	
DRAWN	92	HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D206-667-247	SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (206L MID AFT)	NTS
DATE	10.12.23	COPYRIGHT © 2010 BY DART AEROSPACE LTD	
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



79633

DRAWING NO. D206-667-247	TITLE CROSSTUBE ASS'Y (206L MID AFT)	REV. A	<b>DART AEROSPACE LTD ENGINEERING ORDER</b>		D.E.O. NO. D206-667-247-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN 92	CHECKED ASS	MFG. APPR. KTB	APPROVED JMP		DE APPR. H		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

IS:

Item	Qty -247	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 &amp; 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2892-1 SUPPORT: ABRABE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2892-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED  
2011-07-28  
JMP

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

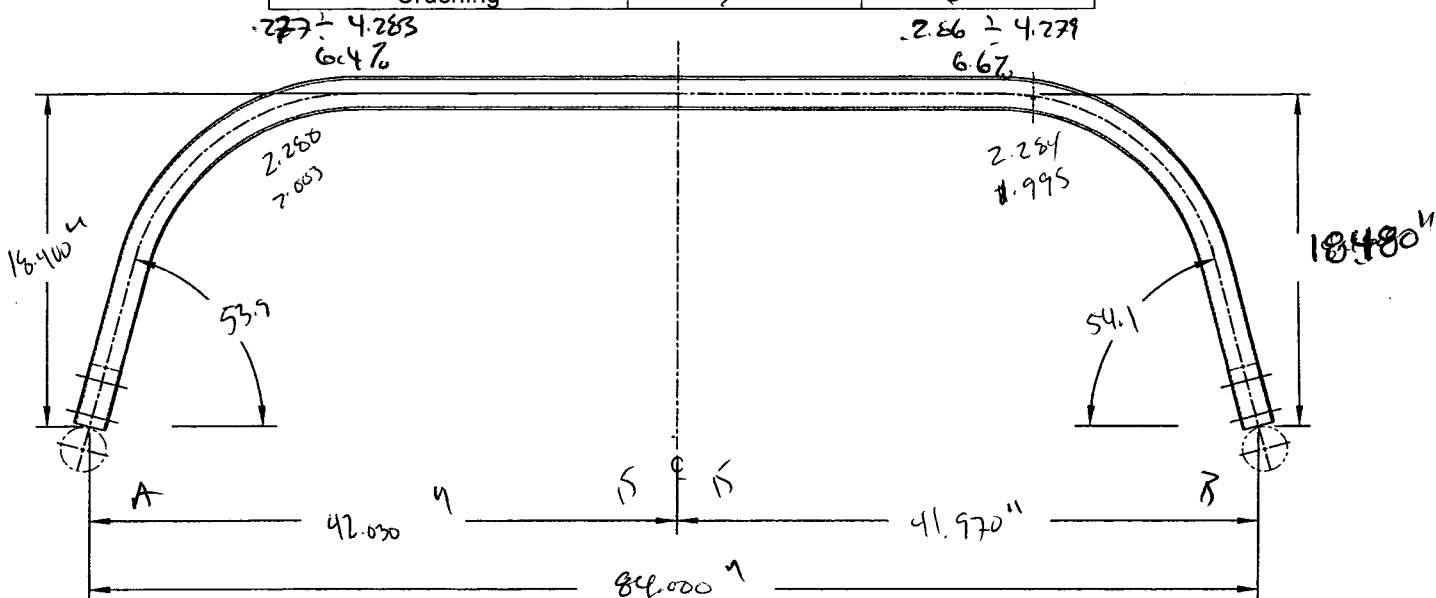
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

<b>DART AEROSPACE LTD</b>	<b>Work Order:</b> 78633
<b>Description:</b> 206L mid aft	<b>Part Number:</b> D206-667-247
<b>Inspection Dwg:</b> D206-667-247	<b>Rev:</b> A
	<b>Page 1 of 1</b>

Required Dimension	Min	Max
Height $16.47 \pm .13$	16.340	16.600
1/2 Span $41.92 \pm .18$	41.74	42.05
Angle $57 \pm 2$	54	56
8384 Total Span $83.84 \pm .25$	83.59	84.09
Bending Passes	15	15
Crushing	✓	6



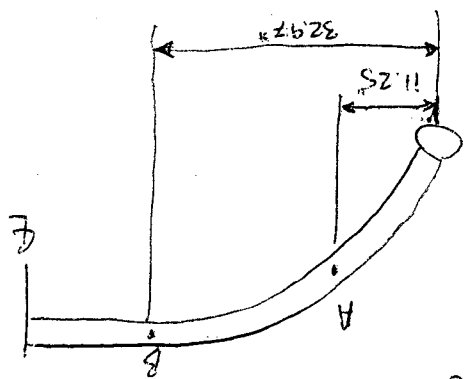
	Side A	Side B
Bending Passes	15 Passes	15 Passes
Crushing	6.4%	6.6%
Comments		

QC15 Inspection	Signature
Date	12/03/02

Rev	Date	Change	Revised by	Approved
A		New Issue		
B	06.09.19	Reformat; QC level revised	KJ/JM	
C	07.02.06	Reformat	KJ/JM	
D	12.02.15	Added bending passes and crushing	KJ	
E	12.03.07	Revised comments table	KJ	

Crossing of 226-667-247

Acceptability of 7.3% crushing at end of bend



Point A:  $OD = 2.283$   $OD2 = 1.973$

$Crossing = (2.283 - 1.973) / (2.283 + 1.973) = 7.3\%$

$I = 0.435 \text{ in}^4$  From AUTOCAD

Point B:  $OD = 2.50 \text{ in}$   $ID = 1.80 \text{ in}$

$I = 1.402 \text{ in}^4$

$H_c F = M_c / I = P \times 11.25 \times 1.973 / 2 \times 0.435 = 13.52 P$   
 $B_c = P \times 32.97 \times 2.50 / 2 \times 1.402 = 29.34 P$

$M.S. = 29.34 / 13.52 - 1 = 1.17$

7.3% Tube will break at support before area of 8% crushing. 7.3% crushing in area at end of bend is acceptable.  
 12.01.13





## LIQUID PENETRANT TEST REPORT

P- 14910

CLIENT	Dnt AeroSpace	DATE	March 15/12	PAGE	1	OF	1	
ATTENTION	Linda L. LARUE	ACUREN JOB NO.	188-12-00067	TIME	AM	<input checked="" type="checkbox"/>	PM	<input type="checkbox"/>
ADDRESS	1270 ABERDEEN	PO/OW NO.						
	HAWKESBURY, ON.	WORK LOCATION	HAWKESBURY					
PROJECT	F.P.I. on CROSS TUBES AND MACHINED PARTS	ACCEPTANCE STD.	ASTM 1417/1418	REV./DATE	2005			
ITEM(S) EXAMINED	(2) CROSS TUBES, (4) MACHINED SLEEVES							

JOB DESCRIPTION	PROCEDURE NO.	LT-202	REV./DATE	2008	TECHNIQUE NO.	LT-202	REV./DATE	2008
PART NO.	SEE RESULTS	MATERIAL	STAINLESS STEEL	THICKNESS	VARIABLE			
SCOPE	LIQUID PENETRANT LIQUID PENETRANT INSPECTION WAS CARRIED OUT ON 100% EXTERNAL SURFACE.							

TEST DETAILS								
METHOD	<input checked="" type="checkbox"/> FLUORESCENT	<input type="checkbox"/> VISIBLE	<input checked="" type="checkbox"/> WATER WASH	<input type="checkbox"/> SOLVENT REMOVABLE	<input type="checkbox"/> POST EMULSIFIED			
FAMILY BRAND	UNIDIFLUX		BLACK LIGHT S/N	16459	<input type="checkbox"/> OUTPUT > 1000 $\mu$ W/CM <sup>2</sup>	<input type="checkbox"/> AMBIENT < 2 fc		
PENETRANT	2407	MINIMUM DWELL TIME	450	MIN.	LIGHTING EQUIP.	<input type="checkbox"/> FLASHLIGHT	<input type="checkbox"/> TROUBLELIGHT	<input type="checkbox"/> OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER	H2O	MINIMUM DRY TIME	> 10	MIN.	OTHER			
DEVELOPER	SAOS2	MINIMUM DWELL TIME	10	MIN.	LIGHT METER S/N	1098866	CAL DUE DATE	2-14-08
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS	<input type="checkbox"/> AQUEOUS	<input type="checkbox"/> DRY					

TEST SURFACE					
SURFACE CONDITION	<input type="checkbox"/> AS GROUND	<input type="checkbox"/> AS WELDED	<input checked="" type="checkbox"/> MACHINED	<input type="checkbox"/> SHOT BLASTED	<input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F	<input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F	<input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F	<input type="checkbox"/> > 52°C/ 125°F	

RESULTS- ( <input type="checkbox"/> METRIC <input checked="" type="checkbox"/> IMPERIAL )	
1 73924 - CROSS TUBE ✓	- HAD BEEN RESEALING PLUG  S12103/16
1 78577 - CROSS TUBE ✓	
1 78578 - CROSS TUBE ✓	
1 79633 - CROSS TUBE ✓	
1 79632 - CROSS TUBE ✓	
1 76247 - CROSS TUBE ✓	
1 76246 - CROSS TUBE ✓	
4 78307 - SLEEVE'S ✓	

**Scope of Services**  
The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

**Standard of Care**  
In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

SIGNATURES			
CLIENT REPRESENTATIVE	Andrew Sheldon	DTR # E-08717	
TECHNICIAN (SIGNATURE):		REPORT REVIEWED BY:	
NAME (PRINT):	Mike Hudson	NAME	INITIALS
CGSB LEVEL	II	SNT LEVEL	II
CGSB REG. NO.	6006	CGSB LEVEL	
		SNT LEVEL	
		CGSB REG. NO.	

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

## 5.2 MID-HEIGHT CROSSTUBES

Item	Qty -107	Qty -207	Part Number	Description
	X		D206-667-107	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 MID FWD
		X	D206-667-207	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 MID AFT
7	1		D206-667-147	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 MID FWD
8		1	D206-667-247	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 MID AFT
10	*2		D2891-1	SUPPORT
11		*2	D2892-1	SUPPORT
13	*4		D3595-063-395	RUBBER CUSHION
14		*4	D3595-063-450	RUBBER CUSHION
16	*4		MS21920-20	CLAMP
17		*4	MS21920-22	CLAMP
19	4		AN5-32A	BOLT
20		4	AN5-34A	BOLT
21	4	4	MS21042L5	NUT (OR MS21042-5)
22	8	8	NAS1149C0563J	WASHER (OR AN950JD516)
40	*2	*2	D2873-043	NUT PLATE
41	*2	*2	D2873-045	NUT PLATE
44	10		AN5-7A	BOLT
45		10	AN5-10A	BOLT
46	4		AN5-30A	BOLT
47		4	AN5-32A	BOLT
48	12		AN970-4	WASHER (OPTIONAL)
50	10	10	NAS1149C0563J	WASHER (OR AN960JD516)

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-147/-247 ASSEMBLIES ABOVE